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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,422	06/24/2005	Michael Kempe	3081.93US01	2397
24113 7590 07/09/2007 PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A. 4800 IDS CENTER 80 SOUTH 8TH STREET MINNEAPOLIS, MN 55402-2100			EXAMINER CARTER, MICHAEL W	
			ART UNIT 2809	PAPER NUMBER
			MAIL DATE 07/09/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/511,422

Applicant(s)

KEMPE ET AL.

Examiner

Michael Carter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/14/2004 and 6/24/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-11, 13-15, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oleskevich et al. US Patent 5,790,735 (hereinafter referred to as Oleskevich) in view of Tanuma US Patent 5,864,645 (hereinafter referred to as Tanuma).

3. For claim 10, Oleskevich teaches, a laser comprising a resonator which is limited by an end mirror and an output mirror and in which a fibre is arranged that comprises an active core and can be stimulated by pump radiation (column 5, lines 41-49) to have multi-mode laser activity such that a plurality of transverse modes occur in the resonator, wherein mode mixing occurs in the fibre (column 2, lines 27-31).

Oleskevich does not teach the output mirror has reflective properties for laser and pump radiation varying such that the output mirror reflects pump radiation as well as laser radiation that does not exit from the active core of the fibre and thus predominantly couples out low transverse modes.

However, Tanuma does teach the output mirror has reflective properties for laser and pump radiation varying such that the output mirror reflects pump radiation as well as laser radiation that does not exit from the active region and thus predominantly

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couples out low transverse modes (figure 3 and column 12, lines 29-34) in order to reduce  $\theta_d$  of the laser (column 3, lines 1-3).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Oleskevich's fiber laser with Tanuma's mirror in order to reduce the laser's  $\theta_d$ .

4. For claim 11, Oleskevich teaches the fibre has a layout in loops or in bends so as to promote mode mixing (column 2, lines 27-31).

5. For claim 13, Oleskevich teaches the output mirror is exchangeable (column 5, lines 41-47), thereby providing for switching a wavelength of the laser or a diameter of a laser beam emitted from the laser.

6. For claim 14, Oleskevich in view of Tanuma further teaches the output mirror is exchangeable (Oleskevich: column 5, lines 41-47) and comprises an inner zone and an outer zone surrounding said inner zone (Tanuma: figure 1, label 32).

7. For claim 15, Tanuma teaches the outer zone reflects laser radiation and pump radiation and said inner zone has a lower reflectivity for laser radiation than the outer zone (column 3, lines 16-22).

8. For claim 17, Oleskevich in view of Tanuma further teaches the inner zone is generally circular, having a smaller diameter than the diameter of the active core (Tanuma: column 7, lines 39-42).

9. For claim 18, Oleskevich in view of Tanuma further teaches the laser further comprises beam-expanding optics arranged between an end of the fibre and the output mirror (Tanuma: column 7, lines 67 – column 8, line 3).

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10. For claim 19, Oleskevich teaches a method of generating a laser beam from a laser, the laser comprising a resonator limited by an end mirror and an output mirror, a fibre comprising an active core and stimulated by pump radiation (column 5, lines 41-49) to have multi-mode laser activity such that a plurality of transverse modes occur in the resonator, wherein mode mixing occurs proximate an end of the fibre (column 2, lines 27-31), the method comprising activating said laser (column 5, lines 43-45).

Oleskevich does not teach the output mirror has varying reflective properties for laser and pump radiation such that the output mirror reflects pump radiation and laser radiation not exiting from the active core, thereby coupling out low transverse modes.

However, Tanuma does teach the output mirror has varying reflective properties for laser and pump radiation such that the output mirror reflects pump radiation and laser radiation not exiting from the active region and thereby coupling out low transverse modes (figure 3 and column 12, lines 29-34) in order to reduce  $\theta_d$  of the laser (column 3, lines 1-3).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Oleskevich's fiber laser with Tanuma's mirror in order to reduce the laser's  $\theta_d$ .

11. Claims 12, 20, 22-23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oleskevich in view of Tanuma and further in view of Ohishi et al. US Patent 6,373,863 (hereinafter referred to as Ohishi).

For claim 12, Oleskevich and Tanuma remain applied as above.

The combination of Oleskevich and Tanuma does not teach the fibre active core has a D-shaped cross section.

However, Ohishi does teach the fibre active core has a D-shaped cross section (figure 12, label 16) in order to create two regions, one with  $\text{Yb}^{3+}$  and the other with  $\text{Pr}^{3+}$ , which share a common light conducting path (column 11, lines 59-63).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the combination of Oleskevich and Tanuma with the D-shaped cross section of Ohishi in order to create two regions which share a common light path.

12. For claim 20, Oleskevich teaches providing a pumping source; and positioning a fibre between an end mirror and an output mirror, wherein said fiber comprises an active core and can be stimulated by pump radiation (column 5, lines 41-49) to have a multi-mode laser activity such that a plurality of transverse modes, wherein mode mixing occurs in said fibre when said laser is activated (column 2, lines 27-31).

Oleskevich does not teach the output mirror has reflective properties for laser and pump radiation varying such that the output mirror reflects pump radiation and laser radiation not exiting from said active core, thereby coupling out low transverse modes.

However, Tanuma does teach the output mirror has reflective properties for laser and pump radiation varying such that the output mirror reflects pump radiation as well as laser radiation that does not exit from the active region and thus predominantly couples out low transverse modes (figure 3 and column 12, lines 29-34) in order to reduce  $\theta_d$  of the laser (column 3, lines 1-3).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Oleskevich's fiber laser with Tanuma's mirror in order to reduce the laser's  $\theta_d$ .

Oleskevich also does not teach such that said pumping source will emit a light beam directed at said end mirror.

However, Ohishi does teach the pumping source will emit a light beam directed at said mirror (figure 15, labels 2 and 4) in order to pump the active medium (column 8, lines 46-48).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the Oleskevich laser in view of Tanuma's mirror with Ohishi's arrangement of the pump laser in order to pump the active medium.

13. For claim 22, Oleskevich further teaches fibre is bent so as to promote mode mixing (column 2, lines 27-31).

14. For claim 23, Oleskevich in view of Tanuma and Ohishi further teaches the output mirror is exchangeable (column 5, lines 41-47) and comprises an inner zone and an outer zone (Tanuma: figure 1, label 32), thereby providing for switching a wavelength of a beam emitted by the laser or a diameter of a beam emitted by the laser.

15. For claim 25, Oleskevich in view of Tanuma and Ohishi teaches the inner zone is generally circular and having a smaller diameter than a diameter of the active core ((Tanuma: column 7, lines 39-42).

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16. For claim 26, Oleskevich in view of Tanuma and Ohishi further teaches the laser further comprises beam-expanding optics arranged between an end of the fibre and the output mirror (Tanuma: column 7, lines 67 – column 8, line 3).

17. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oleskevich in view of Tanuma and further in view of Waarts et al. US Patent 4,995,050 (hereinafter referred to as Waarts).

18. For claim 16, Oleskevich and Tanuma remain applied as above.

The combination of Oleskevich and Tanuma does not teach the inner zone is not coaxial to the radiation exiting from the active core.

However, Waarts does teach that the mirror may be placed off center in order to select modes of the cavity (column 1, lines 25-30).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the combination of Oleskevich and Tanuma with the off center mirror of Waarts in order to select modes of the cavity.

19. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oleskevich in view of Tanuma and Ohishi and further in view of Shaw et al. US Patent 4,463,282 (hereinafter referred to as Shaw).

20. For claim 21, Oleskevich in view of Tanuma and Ohishi remains applied as above.

Oleskevich in view of Tanuma and Ohishi does not teach the fibre is looped so as to promote mode mixing.



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However, Shaw does teach that the fibre is looped (figure 1, label 16) in order to promote mode mixing (column 16, lines 52-54).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the combination of Oleskevich in view of Tanuma and Ohishi with the looped fibre of Shaw in order to promote mode mixing.

21. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oleskevich in view of Tanuma and Ohishi and further in view of Waarts.

22. For claim 24, Oleskevich in view of Tanuma and Ohishi remains applied as above.

The combination of Oleskevich in view of Tanuma and Ohishi does not teach the inner zone is not coaxial to the radiation emitted from the active core.

However, Waarts does teach that the mirror may be placed off center in order to select modes of the cavity (column 1, lines 25-30).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the combination of Oleskevich in view of Tanuma and Ohishi with the off center mirror of Waarts in order to select modes of the cavity.

### ***Conclusion***

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patents 5,566,196, and 6,996,316 disclose various shaped cores.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Carter whose telephone number is (571) 270-

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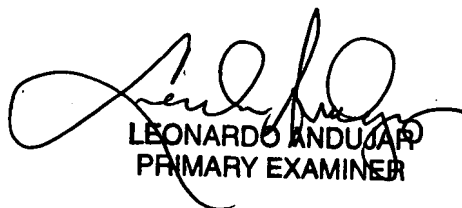
1872. The examiner can normally be reached on Monday-Friday, 7:00 a.m.-4:30 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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